

CLAIMS

1. A device for monitoring the electromagnetic field emitted by a transmission apparatus through an antenna (2), characterized in that it comprises:

- a measurement arrangement (7, 8a, 8b, 10a, 10b, 11, 12, 13 to 17)) adapted to be associated to said transmission apparatus (4) or said antenna (2) for measuring at least one RF power signal emitted by said apparatus and fed in at least one frequency band (TX1, TX2, TX3..., TXn) to the antenna (2), wherein said at least one RF power signal is indicative of the electromagnetic field strength over a given area, and

- a communication device (18) for transmitting said at least one RF power signal to a processing facility (20).

2. The device of claim 1, characterized in that said measuring arrangement comprises a sampling circuit (17) sensitive to the RF power signal fed to the antenna (2) for generating a sequence of samples indicative of the electromagnetic field strength over a given time interval.

3. The device of claim 1, characterized in that said measuring arrangement comprises an average calculating circuit (16) to generate signals indicative of the average electromagnetic field strength over a given time interval.

4. The device of claim 2, characterized in that:

- said sampling circuit (17) generates a first set of samples indicative of the electromagnetic field strength over a given time interval,

- said measuring arrangement comprises an average calculating circuit (16) to generate a signal indicative

of the average electromagnetic field strength over a given time interval, and

- said average calculating circuit (16) is configured for averaging sub sets of said first set of samples to generate a second set of averaged samples, said second set of averaged samples comprising a number of samples that is smaller than the number of samples comprised in said first set of samples.

5 The device of claim 1, characterized in that it comprises a memory (16) for storing said at least one RF power signal in view of transmitting (18) said RF power signal from the device (5).

6 The device of claim 4, characterized in that it comprises a memory (16) for storing said at least one RF power signal in view of transmitting (18) said signal from the device (5), said memory (16) being arranged to store said second set of samples.

7 The device of claim 1, characterized in that said measuring arrangement comprises a plurality of measuring channels (11, 12), each measuring channel being adapted for measuring RF power signals fed to said antenna (2) in a respective frequency band.

8 The device of claim 7, characterized in that it comprises at least one switch (13) for selectively feeding towards said transmitter (18) the output signal of any of said channels (11, 12), whereby RF power signals respectively indicative of electromagnetic field strengths emitted by said antenna (2) for each of said frequency bands are adapted to be transmitted from the device (5).

9 The device of claims 1 to 8, characterised by a control module (16) for controlling the at least one RF power signal fed to the antenna (2).

10. The device of claims 1 to 8, characterised in that the communication device (18) is able of receiving commands for controlling the at least one RF power signal fed to the antenna (2).

5 11. Transmission apparatus comprising a device as claimed in claims 1 to 10.

12. Antenna comprising a device as claimed in claims 1 to 10.

13. A system for monitoring the electromagnetic field strength transmitted by a transmission apparatus through an antenna (2) at a predetermined point of a monitored area, characterized in that it comprises:

- a device according to claims 1 to 10, said device being associated to said transmission apparatus or said antenna (2), whereby said device (5) measures at least one RF power signal fed in at a least one frequency band to said antenna (2) and transmits said at least one RF power signal,

- a geographic data base including information items (206, 208) on the mutual position of said antenna (2) and said predetermined point,

- a processing facility (20) configured (24) for receiving said at least one RF power signal from said device (5) and calculating from said at least one RF power signal and said information items (206, 208) the electromagnetic field strength at said predetermined point.

14. The system of claim 13, characterized in that it comprises a further data base (210) comprising information items corresponding to the relationship between the RF power signal fed towards said antenna (2) and the electromagnetic field emitted from said antenna

(2), whereby said processing facility (24) is configured for calculating:

- the field strength emitted from said antenna (2) starting from said RF power signal and the information  
5 items in said further data base (210), and

- the field strength received at said predetermined point (26) on the basis of the field strength emitted from said antenna (2) and the information items in said geographic data base (206, 208).

10 15. The system of claim 13, characterized in that it comprises a plurality of said devices (5) respectively associated to transmission apparatuses or antennas (2), whereby said plurality of devices (5) provide respective RF power signals to said processing facility (20), said  
15 processing facility (20) being configured (24) for calculating from said RF power signals and the information items in said geographic data base (206, 208) the electromagnetic field strength at said predetermined point (26) resulting from the superposition of respective  
20 electromagnetic fields emitted by the antennas (2).

16. The system of claim 13, characterized in that said processing facility (20) is configured (24) for comparing (220) said value of electromagnetic field strength at said predetermined point (26) with at least  
25 one threshold value.

17. The system of claim 16, characterized in that said processing facility (20) is configured (24) for emitting a warning signal when said electromagnetic field strength at said point (26) reaches said at least one  
30 predetermined threshold value.

18. The system of claim 16, characterized in that it comprises a communication path (18, 25) from said processing facility (20) towards said device (5) for

transmitting from said processing facility (20) adjustment signals of the RF power signals fed towards said antenna (2) when said electromagnetic field at said point (26) reaches said at least one predetermined  
5 threshold value.

19. A method for monitoring the electromagnetic field strength at a predetermined point (26) of a monitored area, characterized in that it comprises the steps of:

10       - measuring at least one RF power signal fed in at least one frequency band to an antenna (2) and transmitting the at least one RF power signal indicative of the electromagnetic field strength over a given area towards a processing facility (20),

15       - providing a geographic data base including information items (206, 208) on the mutual position of said antenna (2) and said predetermined point (26),

          - receiving at said processing facility (20) said RF power signal and calculating on the basis of said at  
20 least one RF power signal and said information items (206, 208) the electromagnetic field strength at said predetermined point (26).

20. The method of claim 19, characterized in that it comprises the steps of:

25       - providing a further data base (210) including further information items corresponding to the relationship between the RF power signal fed towards said antenna (2) and the electromagnetic field emitted from said antenna (2), and

30       - calculating at said processing facility (20) the electromagnetic field at said predetermined point (26) on the basis of the relationship between the RF power signal fed towards said antenna (2) and the electromagnetic

field emitted from said antenna (2) and the information items in said geographic data base (206, 208).

21. The method of claim 19, for monitoring the electromagnetic field strength received from a plurality  
5 of antennas (2) at a predetermined point (26) of a monitored area, characterized in that it comprises the steps of providing respective RF power signals to said processing facility (20), said processing facility (20) being configured (24) for calculating from said RF power  
10 signals and the information items in said geographic data base (206, 208) the electromagnetic field strength at said predetermined point (26) resulting from the superposition of respective electromagnetic fields emitted by the antennas of said plurality.

15 22. The method of claim 19, characterized in that it comprises the steps of comparing (220) said value of electromagnetic field strength at said predetermined point (26) with at least one threshold value.

23. The method of claim 22, characterized in that it  
20 comprises the step of emitting a warning signal when said electromagnetic field strength at said point (26) reaches said at least one predetermined threshold value.

24. The method of claim 22, characterized in that it comprises the step of transmitting from said processing  
25 facility (20) adjustment signals of the RF power signals fed towards said antenna (2) when said electromagnetic field at said point (26) reaches said threshold value.

25. The method of claim 19, characterized in that it comprises the step of adjusting the RF power signals fed  
30 towards said antenna (2) on the basis of at least one predetermined threshold value of said RF power signals.

26. The method of claim 19, characterized in that it comprises the step of selectively sensing the RF power

fed to said antenna (2) over different frequency bands and the step of computing the electromagnetic field strength at said predetermined point for each of said different frequency bands.